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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/699,947	10/30/2000	Edmund J. Kelly	TRANS04D	8830

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EXAMINER

THAI, TUAN V

ART UNIT	PAPER NUMBER
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2186

DATE MAILED: 09/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

4

Office Action Summary

Application No.

09/699,947

Applicant(s)

KELLY ET AL.

Examiner

Tuan V. Thai

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 August 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,5-9,12,13 and 18-20 is/are pending in the application.
- 4a) Of the above claim(s) 4,10,11 and 14-17 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,5-9,12,13 and 18-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 October 2000 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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Part III DETAILED ACTION

Specification

1. This office action is in response to a request for continued examination under 37 CFR 1.114. Applicant's submission filed August 17, 2005 has been entered. This amendment has been entered and carefully considered. Claims 1-3, 5-9, 12-13 and 18-20 remain pending in the application. Claims 4, 10-11 and 14-17 have been cancelled.

2. Applicant is reminded of the duty to fully disclose information under 37 C.F.R 1.56.

Claim Objections

3. Claim 1 is objected to for the following reasons:

As per claim 1, it appears that the recitation of "a memory address" (line 9) and "a target instruction" are referred to -a memory address- (line 6) and -a target instruction- (line 7) respectively. They should be changed to read -said memory address- and -said target instruction- respectively.

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Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1-3, 5-9, 12-13 and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moore et al. (USPN: 5,437,017), hereinafter Moore, in view of IBM TDB, May 1994, Vol. 37, Issue 5, pages 249-250; hereinafter IBM 37.

As per claim 1, Moore teaches the invention as claimed including a method and system for protecting memory from being written in a computer [6] which includes a host processor designed to execute instructions of a host instruction set and software synchronization utilized for instruction/data translation and TLB coherency (e.g. see column lines 36-37) comprises hardware means having a translation look-aside buffer with a storage position in each storage location included in each processor for translating an effective or virtual address to a real address within system memory (e.g. see figure 1, column 4,

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lines 19 et seq.); the host instruction is known to be executed by the host processor since Moore clearly discloses the instructions from instruction queue 22 are dispatched to the execution unit which is known to be executed the host processor (e.g. see column 4, lines 59 et seq.); software means responding an indication ... once the memory address has been written is taught as the software implementation of a translation look-aside buffer invalidate (TLBI) instruction or by software synchronization throughout the multiprocessor data processing system (e.g. see column 2, lines 36-37; figure 5, column 8, lines 32 et seq.). Moore discloses the invention as claimed except means for indicating whether memory address stores target instruction which has been translated into host instruction.

IBMTDB 37, in its teaching of the use of the SYNC instruction to synchronize completion of Translation Lookaside Buffer Invalidate in Multiprocessor system, discloses the means for indicating whether memory address stores target instruction which has been translated into host instruction as being equivalent to the SYNC operation instruction signal received from the receiving processor after broadcasting of the TBLI instruction for indicating of whether the instruction has been translated/ executed within the local receiving processor (TBLI instruction has taken effect throughout the SMP environment; e.g. see disclosure text). Accordingly, it would have been obvious to one

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having ordinary skill in the art at the time the current invention was made to utilize the means for indicating whether memory address stores target instruction which has been executed/translated into host instruction (being equivalent to the SYNC operation signal) as taught and being disclosed in the IBM TDB 37 for that of Moore's system in order to arrive at Applicant's current invention. In doing so, it would enhance system reliability and throughput by allowing the host in Moore's system to quickly and uniformly execute instructions wherein only instructions which has been translated from target into host instruction can be executed, therefore being advantageous.

As per claim 2, Moore further discloses the memory management unit 34 (hardware means) comprises look-aside buffer 40 having plurality of storage locations for virtual addresses and associated physical addresses, and a storage position in each storage location (e.g. see figure 32 column 6, lines 22 et seq.);

As per claim 3, software means for invalidating host instruction translated from target instructions stored at the memory address is clearly taught by Moore as the software synchronization throughout the multiprocessor data processing system, also by the software implementation of a translation look-aside buffer invalidate (TLBI) (e.g. see column lines 36- figure column lines 32 et seq.; also see abstract, column 3, lines 12 et seq.);

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As per claim 5, Moore discloses software means for protecting against writing the memory address removes translations associated with the memory address taught as software synchronization and means for purging instructions within the plurality of processors for achieving coherency (e.g. see column 2, lines 36-37; and claims 12 and 13);

As per claim 6, Moore further discloses the memory management unit 34 (hardware means) comprises look-aside buffer 40 having plurality of storage locations for virtual addresses and associated physical addresses, and a storage position in each storage location (e.g. see figure 3; column 6, lines 22 et seq.); software means for protecting against writing the memory address removes translations associated with the memory address is taught as software synchronization and means for purging all instructions within the plurality of processors for achieving coherency (e.g. see column 2, lines 36-37; and claims 12 and 13);

As per claims 7 and 8, see arguments with respect to claim in addition, Moore further discloses hardware means for generating and exception to a write access ... to a host instruction as being equivalently taught as means for suspending execution of instructions within each of said plurality of processors until coherency is achieved (e.g. see claim 12); Moore also discloses the memory management unit 34 (hardware means) comprises look-aside buffer 40 having plurality of storage

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locations for virtual addresses and associated physical addresses, (e.g. see figure 1; column 2, lines 7 et seq.; figure 3, column 6, lines 22 et seq.);

As per claim 9, software means responding to an exception to a write will not be utilized before being updated is taught as software synchronization and means for purging all instructions within the plurality of processors for achieving coherency (e.g. see column 2, lines 36-37; and claims 12 and 13); also the processing of a translation look-aside buffer invalidate (TLBI) instruction throughout the multiprocessor data processing system (e.g. see figure 5, column 8, lines 32 et seq.);

As per claims 12 and 13; they encompass the same scope of invention as to that of claim except that they are drafted as method format rather apparatus format, the claims are therefore rejected for the same reasons as being set forth above. It further noted that further limitation of the host instruction for execution by the host processor is taught by Moore since Moore clearly discloses the instructions from instruction queue 22 are dispatched to the execution unit which is known to be executed the host processor (e.g. see column 4, lines 59 et seq.);

As per claims 18-20, they encompass the same scope of invention as to that of claims 1-3, it should further be noted that the memory controller being claimed in claim 18 in which it comprises a translation look-aside buffer... etc, is equivalent

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to the memory management unit (MMU) having a TLB (e.g. see figure and other equivalent elements as detailed in claims 1-3. The claims therefore are rejected for the same reason as set forth above. It should be noted that the concept of target instruction being translated into host instruction wherein code intended for a first target processor is translated into code for running on different host processor which is clearly taught by Moore starting on column 4, lines 19 et seq.; for example, Moore does disclose that if the conditional branch is predicted as "taken" then the target instruction is utilized, otherwise it is purged, and the sequential instruction is retrieved.

6. As per remark, Applicant's counsel asserts that (a) Moore does not teach the host instruction for execution by the host processor (emphasis added) (page 10, first paragraph); (b) Moore does not teach, describe or suggest a system for maintaining translation consistency in a computer including "hardware means for indicating whether a memory address to be written stores a target instruction which has been translated to at least one host instruction", and "translating instructions of a target instruction set into a host instruction set and maintaining coherency between these transaction types" (page 12, second paragraph et seq.).

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With respect to (a); first of all, it should be noted that limitation being contended by the Applicant's counsel wherein the host instruction for execution by the host processor is taught by Moore since Moore clearly discloses the instructions from instruction queue 22 are dispatched to the execution unit which is known to be executed the host processor (e.g. see column 4, lines 59 et seq.). With respect to (b), Examiner would like to emphasize that the hardware means for indicating whether a memory address to be written stores a target instruction which has been translated to at least one host instruction is equivalently taught by Moore as condition register 32 within processor 10 of the multiprocessor data processing system 6 includes a translation lookaside buffer (TLB) 40 which is utilized to translate effective or virtual addresses for instructions or data into real addresses within system memory 18 (e.g. see column 4, lines 19 et seq.), wherein the condition register 32 is utilized to temporarily store the results/status of various comparisons which may occur utilizing the outcome of sequential instructions which are processed within multiscalar processor 10, the status of a particular condition within condition register 32 is detected and coupled to branch processor unit 28 in order to generate target addresses (being translated to at least one host instruction), which are then utilized to fetch target instructions in response

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to the occurrence of a condition which initiates a branch (e.g. see column 5, lines 29-41). In addition, the concept of "translating instructions of a target instruction set into a host instruction set and maintaining coherency between these transaction types" is taught as each processor within the multiprocessor data processing system typically includes a translation look-aside buffer (TLB) for address translation (wherein instructions of a target instruction set is translated into a host instruction set) and the shared aspect of memory within such systems requires that changes to a single translation look-aside buffer (TLB) within one processor in a multiprocessor system be carefully and consistently mapped into each translation look-aside buffer (TLB) within each processor within the multiprocessor computer system in order to maintain coherency (e.g. see column 2, lines 22-32).

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuan V. Thai whose telephone number is (571)-272-4187. The examiner can normally be reached on from 6:30 A.M. to 4:00 P.M..

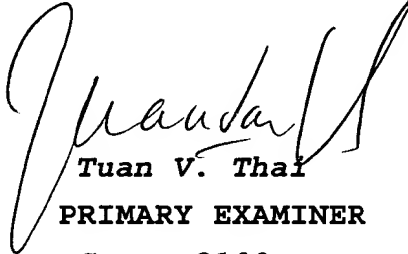
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mathew M. Kim can be reached on (571)-272-4182. The fax phone number for the organization where this application or proceeding is assigned is

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571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TVT/August 30, 2005


Tuan V. Thai
PRIMARY EXAMINER
Group 2100